REMARKS

Claims 12-21 are pending and under consideration. Claims 12, 17, 19, and 21 have been amended. Claim 11 is cancelled herein, without prejudice or disclaimer. Support for the amendments to the claims may be found in the claims as originally filed, as well as at paragraphs **[0028]** and **[0029]** of the specification. This amendment is believed to place the application in condition for allowance, and entry therefore is respectfully requested. In the alternative, entry of this amendment is requested as placing the application in better condition for appeal by, at least, reducing the number of issues outstanding. Further reconsideration is requested based on the foregoing amendment and the following remarks.

Response to Arguments:

The Applicants appreciate the consideration given to their arguments. The Applicants, however, are disappointed that their arguments were not found to be persuasive. At page 2, lines 5-18 of the final Office Action appears the statement:

> Examiner disagrees because applicant has not set any defining language in the application to differentiate a "refrigeration unit" for either a cooler of "heat exchanger." According to § 2111 of the MPEP, claims must be given their broadest reasonable interpretation. A portion of this section is cited below for the practitioner's convenience:
>
> > During patent examination, the pending claims must be "given *>their< broadest reasonable interpretation consistent with the specification." >*In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000).< Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).
>
> "Refrigeration unit" is broad enough to read on either a cooler or "heat exchanger." Furthermore. The radiator of Glauning is a "refrigeration unit" because it cools the temperature of the cooling fluid.
>
> As also provided in M.P.E.P. 2111, however:
>
> The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

Here, equating the refrigeration unit of the claimed invention with either a cooler or a heat exchanger is submitted to be inconsistent with the interpretation that those skilled in the art would reach, in contravention of M.P.E.P. 2111.

The understanding by those of skill in the art of the term "refrigeration unit" may be discerned from U.S. Patents published before the subject application was drafted, such as No. 5,555,740 to Stevenson or No. 6,216,481 to Kantchev. In Stevenson, for example, mechanical refrigeration devices, i.e. refrigeration units, are described as providing mechanical compression of a gas and using the temperature drop caused by the expansion of a gas for cooling, and more specifically to a portable device using manually supplied mechanical input for the compression of the gas, at column 1, lines 5-10.

Similarly, in Kantchev, a refrigeration system, i.e. unit, is described at column 3, lines 23-30 as utilizing "several compressors 2 which compress the low pressure refrigerant vapors from the evaporators 4 which each has a conventional evaporator pressure regulating valve 5."

A heat exchanger, in contrast, is a passive device that brings a warm body into contact with a cooler body, such as coolant and air in case of a radiator of a car. In a heat exchanger, a channel carrying a high temperature fluid is separated by a conductive wall from a channel carrying a low temperature fluid. Heat in the high temperature fluid is conducted across the wall to the low temperature fluid, without the further addition of energy.

Thus, refrigeration units are unlike heat exchangers, which are passive devices, as discussed above, and have no compressors. A refrigeration unit performs work to move heat, often from a low temperature body, such as the interior of a refrigerator, to a high temperature body, such as a kitchen in which the refrigerator is placed. A heat exchanger may be one *component* of a refrigeration unit, along with, for example, a pump or compressor and a means to expand the compressed fluid, such as a throttle or a valve. The refrigeration system of Kantchev, in fact, as described as having an outdoor air-cooled condenser, i.e. a heat exchanger, where the vapors are condensed. Therefore, it is not reasonable to read the refrigeration unit of the claimed invention on a heat exchanger or a cooler.

In any case, claim 21 has been amended to define the refrigeration unit further as "comprising at least one cold head having at least one cold surface." None of the cited references disclose a cooler or a heat exchanger "comprising at least one cold head having at least one cold surface," as recited in claim 21, let alone a refrigeration unit.

At page 3, lines 6 and 7 of the final Office Action appears the statement:

> Just because a reference does not expressly disclose a limitation does not mean it is not or could not be present in the reference.

35 U.S.C. § 103(a), under which the subject claim was rejected, however, requires each element of the claims to *either* be "identically disclosed or described as set forth in section 102 of this

title," *or* "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." There is no provision in 35 U.S.C. § 103(a) for a limitation that *could* be present in a reference.

Finally, at page 3, lines 10, 11, and 12 of the final Office Action appears the statement:

> Thus, the examiner disagrees that Philosfsky will not run when pump 55 is replaced with a thermosiphon pump of Glauning, US 6087744. The device may not run well but it would still operate.

But a modification that would make a device "not run well" would necessarily not be a modification which persons of ordinary skill in the art would have been motivated to make. This logic is embodied in M.P.E.P. §2143.01. As provided therein:

> If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The dynamoelectric machine of Philosfsky would only run without pump 55 until it overheated. The dynamoelectric machine of Philosfsky is not meant to overheat. In this case, modifying Philosfsky as proposed in the final Office Action would render Philosfsky unsatisfactory for its intended purpose of running without overheating, and there is thus no motivation to make the proposed change, *In re Gordon*.

The cooling system of Philosfsky, in addition, uses a monophasic, or single-phase fluid. A thermosiphon effect, on the other hand, can only develop effectively through the use of a two-phase fluid. In a single-phase fluid all that happens is a thermally caused convection of the fluid. Thus, even if Philosfsky were modified as suggested in the final Office Action, the claimed invention would not result.

Philosfsky and Glauning, furthermore, disclose technically contrary means of cooling a stator winding. Philosfsky, in particular, discloses cooling by means of a forced-air circulation monophasic coolant. The stator in Glauning, on the other hand, is cooled indirectly, by means of a cooling jacket. Thus, persons of ordinary skill in the art who began with Philosfsky and knew of Glauning would have been motivated to cool a stator with a forced-circulation monophasic fluid running in a cooling jacket, not the claimed invention.

In any case, claim 21 has also been amended to include the phrase "wherein the heat generating parts of said stator are located at a geodetic lower level than the cold surface," a

feature not to be found in the cited references, in combination with the other elements of claim 21, either. Further reconsideration is thus requested.

Claim Rejections - 35 U.S.C. § 103:

Claim 21 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,271,600 to Philofsky et al. (hereinafter "Philofsky") in view of U.S. Patent No. 6,087,744 to Glauning et al. (hereinafter "Glauning") and U.S. Patent No. 3,906,261 to Ogura et al. (hereinafter "Ogura"). The rejection is traversed to the extent it might apply to the claims as amended. Reconsideration is earnestly solicited.

The fifth clause of claim 21 recites:

> A refrigeration unit comprising at least one cold head having at least one cold surface.

Neither Philofsky, Glauning nor Ogura teach, disclose, or suggest, "a refrigeration unit comprising at least one cold head having at least one cold surface," as recited in claim 21. Philofsky, rather, relies on blower 33 to circulate gas within the housing and ducts, as described at column 3, lines 39, 40, and 41, and as shown in Fig. 1. Cooler 56 is a cooler, as described at column 4, lines 8-14, not a refrigeration unit, contrary to the implication in the final Office Action. Cooler 56 may be seen clearly in Fig. 1, in fact, to be a parallel flow heat exchanger, not a "refrigeration unit," as recited in claim 21, at all.

Glauning, for its part, circulates fluid through a radiator, not "a refrigeration unit," as recited in claim 21. In particular, as described in Glauning at column 2, line 67, continuing at column 3, lines 1-5:

> The Figure schematically shows an internal combustion engine 100, a radiator 101, and two conduits 102, 103 for feeding fluid from the engine 10 in the radiator 101 and back again. Cooling fluid for the electrical machine 1 is tapped form the conduit 103 by a tube 104 and fed back to a pump 106 by a tube 105.

Ogura, finally, utilizes ebullition of the cooling medium, as described at column 1, lines 5-9, and thus has no use for "a refrigeration unit comprising at least one cold head having at least one cold surface," as recited in claim 21. Thus, even if Philofsky, Glauning, and Ogura were combined, as proposed in the final Office Action, the claimed invention would not result.

The eighth clause of claim 21 recites:

> Said line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled.

Neither Philofsky, Glauning nor Ogura teach, disclose, or suggest a "line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled," as recited in claim 21, either. Thus, even if Philofsky, Glauning, and Ogura were combined, as proposed in the final Office Action, the claimed invention would not result.

Philofsky, rather, teaches away from discrete cooling areas at column 1, lines 43-47, where he describes connecting an individual, i.e. discrete vent tube to each coil as "prohibitive in view of the large number of coils and tubes in each machine, which would require over 1500 connections for a typical machine."

Similarly, in Glauning, a cooling jacket 40, rather than "discrete coolant areas associated with the parts of said stator to be cooled," as recited in claim 21, surrounds the stator 34, as described at column 3, lines 12 and 13.

Ogura, finally, immerses the stator winding in vaporizable liquid, as described in the Abstract. Thus, even if Philofsky, Glauning, and Ogura were combined, as proposed in the final Office Action, the claimed invention would not result.

The twelfth clause of claim 21 recites:

> A coolant is circulated by a thermosiphon effect with boiling and vaporization, the coolant being heated or at least partially vaporized in the discrete coolant areas.

The final Office Action states at page 4 lines 14, 15, and 16 that:

> The combination of Philofsky, US 3271600 and Glauning, US 6087744 does not expressly disclose, " . . . in which a coolant is circulated by a thermosiphon effect with boiling and vaporization . . ."

The final Office Action seeks to compensate for this deficiency of Philofsky and Glauning by combining them with Ogura, saying at page 4, lines 18-21 that:

> At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a two-phase coolant in the device of the combination of Philofsky, US 3271600 and Glauning, US 6087744. One of ordinary skill in the art would have been motivated to do this the advantage of the large heat capacity of the latent heat of vaporization of the cooling fluid to more effective cool the stator.

A a thermosiphon effect with boiling and vaporization, however, isn't the only deficiency of Philofsky, US 3271600 and Glauning with respect to claim 21. Philofsky, rather, also lacks a refrigeration unit, as discussed above. Philofsky, in particular, relies on external pump or

compressor 55 to circulate coolant through cooler 56, as described at column 4, lines 8-12. To circulate coolant by a thermosiphon effect, on the other hand, requires a thermal gradient, something cooler 56, a parallel flow heat exchanger, cannot provide, at least after you dispense with the pump. Thus, modifying Philofsky as proposed in the final Office Action will render the reference unsuitable for its intended purpose of cooling a stator, as well as inoperable, in contravention of M.P.E.P. § 2143.01. Philofsky will overheat if it is run without a pump.

In the claimed invention, no pump is used and circulation is performed exclusively by boiling and evaporation, i.e. a thermosiphon, as described in the specification of record at, inter alia paragraphs [0010] and [0030].

Although a thermosiphon is mentioned in Glauning, the coolant flow to which it pertains circulates in coolant passages 28 and 38, which run to a substantially cylindrical coolant jacket 40 connected with an inner surface 45 of a substantially cylindrical housing 36. In particular, as described at column 3, lines 13-21:

> The cooling jacket 4 which is substantially cylindrical is connected with an inner surface 45 of a substantially cylindrical housing 36. The cooling jacket 40 has one or several ring-shaped or meander-shaped grooves which operate as cooling passages 38. Due to the resulting great contacting surface of the cooling jacket 40 with the housing 30, a good heat transfer from the stator 34 to the cooling jacket 40 and thereby to the housing 36 is guaranteed.

The stator winding of Glauning is cooled virtually exclusively by air, providing, at best, an indirect removal of heat from the stator 34. In particular, as described at column 4, lines 27-42:

> The air which is located in the supply chamber 54 is further guided through several openings 14 or a longitudinal slots 15, which guide the air in direction of an air gap between the rotor 44 and the stator 34. The air passes over the winding head 10 at the drive side and can take the heat. Simultaneously, it is cooled by passing over the water-cooled housing 46, before it is guided through the air gap between the rotor 44 and the stator 34, as well as through the claw pole 46 and an excitation winding 16 toward the winding head 18. Therefore the above mentioned elements are cooled.
> When the air passes the water-cooled housing 36, it takes the heat with it and is cooled. The air can flow out from the electrical machine 1 through several openings 22 or longitudinal slots 23 arranged at the end side of the housing 36. A part of the flowing out air is again aspirated trough the opening 2 as a fresh air. Thereby a partially closed circulation is produced.

In the claimed invention, on the other hand, the stator winding is cooled directly by coolant which circulates in the closed piping system using the thermosiphon effect. This allows the heat to be removed directly from the stator winding, *where it originates*. This is described in the present specification of record at, inter alia paragraphs [0011], [0013], and [0017].

Finally, since, as recited in claim 21, "coolant is circulated by a thermosiphon effect with boiling and vaporization," a two-phase coolant is used. This allows relatively small cross sections in separate tubes, especially in the area of the stator, to take advantage of the evaporation enthalpy of the coolant. Claim 21 is submitted to be allowable. Withdrawal of the rejection of claim 21 is earnestly solicited.

Claims 12-20 depend from claim 21 and add additional distinguishing elements. Claims 12-20 are thus also submitted to be allowable. Withdrawal of the rejection of claims 12-20 is earnestly solicited.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all of claims 11-21 are allowable over the cited references. There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 13 Sep 06

By: _____
Thomas E. McKiernan
Registration No. 37,889

1201 New York Ave, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501